IN THE DRAWINGS

Please replace the Drawings with the amended and/or corrected Drawings attached herewith as separate pages:

Attachment: Replacement Sheets

DISCUSSION OF THE CLAIMS

Claims 1-5 and 8-20 are pending in the present application. Claims 15 and 19-20 are presently withdrawn from active prosecution. Claims 6-7 are canceled claims. Independent Claim 1 is amended to include one or more features of previously pending Claims 6 and 7. The claims are further amended for matters of form.

The Drawings are amended to address matters of form.

No new matter is added.

REMARKS

Applicants disclose a luminescent material having substantially improved luminous efficiency in comparison to conventional luminescent materials. The luminescent material of the claimed invention is derived from a silicon-based monomer material that contains an organic component that emits fluorescence or phosphorescence. Polymerization of the monomer unit under particular conditions provides a luminous material having improved luminous efficiency.

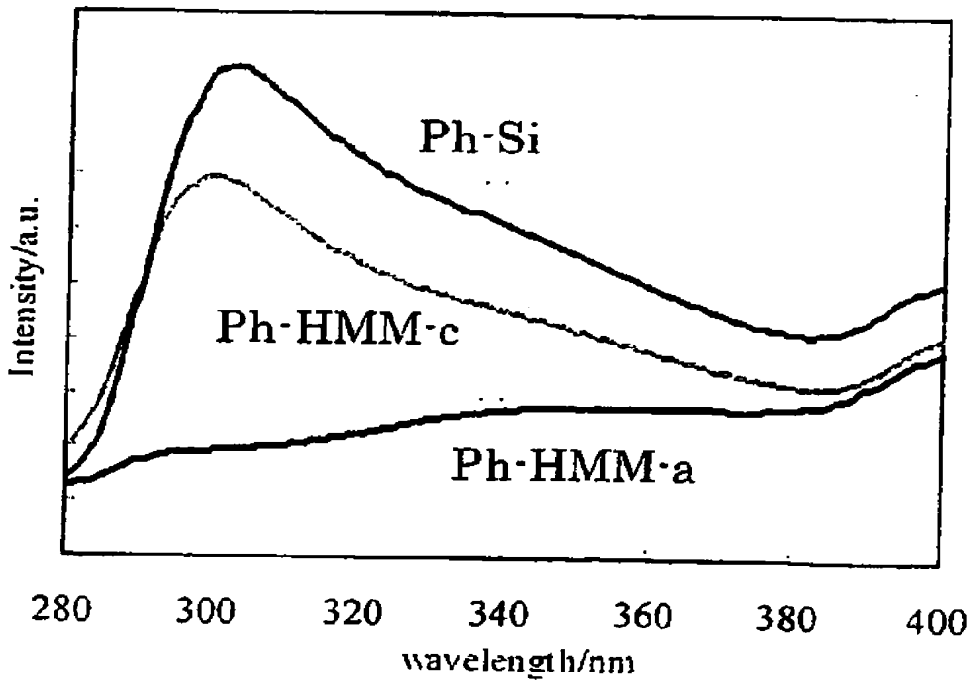
The examples of the specification demonstrate that a luminous material having a polymeric portion with particular structure has substantially improved luminous efficiency and/or fluorescence/phosphorescence properties in comparison to conventional materials made from conventional silicon-based monomer units. Applicants draw the Office's attention to Table 1 on page 53 of the specification (shown below for convenience).

TABLE 1

		Synthesis conditions	Structure	
Example	Sample name	Surfactant Acidic/Basic	Meso-structure	Benzene periodicity
1	Ph-HMM-c	C18TMACl Basic	○	○
2	Ph-Si	None Basic	X	○
3	Ph-HMM-a	P123 Acidic	○	X

Example 1 meets the mesostructure requirement of the present claims. Figure 7 below describes the fluorescent spectra of Examples 1-3. It is readily evident from Figure 7 that Example 3 (i.e., Ph-HMM-a) is unable to meet the requirement of the Claim 4 that a difference in energy between a ground state and an excited state is 40-140 kcal/mol.

Fig. 7



The Examples prove an important point with respect to the structure and property of the claimed mesoporous luminescent material. In particular, certain mesostructure properties are not inherent to polymeric materials derived from alkoxy-substituted silicon-based monomers and the absence of a mesoporous structure is associated with a luminescent material that is unable to meet the requirement of the Claim 4 that a difference in energy between a ground state and an excited state is 40-140 kcal/mol.

Applicants note that original Claim 5 further requires that the claimed luminescent material have a certain periodicity.

The Office rejected Claims 1-7 as anticipated over Shea 1 (*Chem. Mater.* – 1989) and Shea 2 (*J. Am. Chem. Soc.* - 1992). The Office further rejected the claims as anticipated by Fan (U.S. 2003/0039744). As discussed above, the examples of the present specification prove that the mesoporosity properties recited in Claim 1 are not inherent to polymeric

materials derived from $(EtO)_3Si\text{-}Ph\text{-}Si(OEt)_3$. In fact, in order to obtain the mesoporosity recited in the present claims it is necessary to form the polymeric material in the presence of a surfactant such as the octadecyltrimethylammonium chloride of Example 1 or the poly(methyleneoxide)/poly(propyleneoxide) surfactant of Example 3. Carrying out the hydrolysis of the monomer unit $(EtO)_3Si\text{-}Ph\text{-}Si(OEt)_3$ in the absence of a surfactant provides a material that does not have the mesoporosity required by Claim 1 (see Example 2 of the present specification).

Like mesoporosity, a periodic structure does not inhere to all polymeric materials derived from alkoxy-substituted silicon-based monomer units. This is shown by Example 3 which meets the mesoporosity requirements of Claim 1 but fails to meet the periodicity requirements of Claim 5.

Applicants submit that the examples of the original specification rebut the Office's assertion with respect to the inherency of certain porosity requirements of the original claims. Applicants request withdrawal of the rejection of the claims as anticipated over Shea 1, Shea 2 and Fan.

The Office rejected one or more of the dependent claims as obvious over the above-discussed Shea and Fan publications in combination with one or more secondary references. With regard to the Office's reliance on Bartl (*Chem. Commun.* - 2002), the Office appears to take the position that it is conventional to mix luminescent materials with a silica matrix, and thus it would be obvious to mix such a luminescent material with a mesoporous luminescent material derived from a fluorescent phosphorescent-containing silicon alkoxide monomer.

Applicants point out that the silica matrix of Bartl is substantially different from the matrix of the claimed mesoporous luminescent material. For example, the Bartl matrix is made by hydrolyzing tetraethylorthosilicate (see the last paragraph in the left-hand column on page 2474 of Bartl). Applicants submit that it is readily evident that the resultant silica

material is substantially different from the mesoporous luminescent material of the present claims. The hydrolysis of tetraethylorthosilicate (TEOS) cannot form a polymer such as that recited in the present claims because tetraethylorthosilicate does not include any organic molecule directly bonded to a silicon atom nor does TEOS contain any portion of an organic molecule that is fluorescent and/or phosphorous.

Applicants submit that the Office failed to identify a sufficient nexus between Bartl, the cited primary reference and the presently claimed invention. Bartl describes materials that are different from the materials of the Shea and Fan publications and are likewise different from the presently claimed invention. Bartl nowhere discloses or suggests that luminescent materials may be added to silica substrates and/or matrices that are derived from alkoxy-based silicon monomers that include fluorescent/phosphorescent organic moieties directly bonded to a silicon atom.

Applicants thus request withdrawal of the rejection.

The same is true for the Office's reliance on Matthews (*Chem. Mater.* - 1993). Matthews, like Bartl, fails to disclose or suggest any matrix or mesoporous luminescent material that includes a fluorescent and/or phosphorescent organic moiety directly bonded to a silicon atom. Instead, Matthews discloses the inclusion of certain luminescent materials in a silica matrix derived from TEOS. As discussed above in detail, TEOS forms a polymer that does not have any Si-carbon bonds. Further, the silica matrix derived from TEOS does not include any fluorescent/phosphorescent moiety directly bonded to the silicon network of the silica matrix.

Applicants thus submit that the rejection of one or more of the dependent claims in view of a combination of one or more of the primary references with Matthews is not supportable and should be withdrawn.

The Office rejected Claim 17 as obvious over the combination of one of the Shea publications Ogawa (*J. Amer. Chem. Soc.* - 1994). The Office asserts that the nanostructure recited in Claim 17 is rendered obvious in view of Ogawa.

Ogawa like Matthews and Bartl above discloses a silica material made from a tetraalkoxysilicon compound (i.e., tetramethoxysilane - see the second paragraph in the left-hand column on page 7941 of Ogawa). The silica matrix material derived from tetramethoxysilane cannot possibly include a Si-carbon bond and likewise cannot include fluorescent/phosphorescent material that is directly bonded to the silicon atoms of the resulting polymer.

Applicants submit that it is immaterial that the tetraalkoxy-based silica polymers of Ogawa may be arranged in a layered nanostructured manner. The silica polymers of Ogawa are substantially different from the polymer of the present claims which is derived from an alkoxy based silicone that is directly bonded to a fluorescent/phosphorescent organic molecule. Applicants thus submit that the combination of Ogawa and one or more of the Shea or Fan publications is not supportable and should be withdrawn.

Applicants thank Examiner Bohaty and the Examiner's Supervisor Mr. Tarazano for the helpful and courteous discussion of November 10, 2009. During the discussion, Applicants' U.S. representative pointed out that the examples of the present specification describe a porous luminous material having fluorescent and/or phosphorescent properties not inherent to materials described in the cited art.

For the reasons discussed above in detail, Applicants request withdrawal of the rejection and the allowance of all now-pending claims.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, L.L.P.
Norman F. Oblon

Stefan U. Koschmieder, Ph.D.
Attorney of Record
Registration No. 50,238

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/09)